

**Before the  
Federal Communications Commission  
Washington D.C. 20554**

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**MAR - 1 1993**

In the matter of  
  
Amendment of the rules  
relating to permissible  
uses of the vertical  
blanking interval of broadcast  
television signals

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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

MM Docket No. 92-305  
RM 8066  
RM 8067

COMMENTS OF NORTH AMERICAN PHILIPS CORPORATION

**I. INTRODUCTION**

North American Philips Corporation (NAPC) offers its comments to the Commission's Notice of Proposed Rule Making (Notice) to reserve the use of line 19 of the vertical blanking interval for ghost cancellation. With corporate headquarters located in New York City, NAPC through its divisions manufactures television receivers and television picture tubes in the United States of America with major manufacturing facilities located in Greeneville, Jefferson City and Knoxville, Tennessee, Ottawa, Ohio and Arden, North Carolina. Through its Philips Laboratories division located in Briarcliff Manor, New York, NAPC developed the ghost cancellation reference signal (GCR signal) which has been recommended for adoption by the Advanced Television Systems Committee (ATSC) after a rigorous series of tests. NAPC urges the Commission to reserve the use of line 19 of the vertical blanking interval for this service, and to adopt the Philips GCR signal.

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## II. BACKGROUND

NAPC totally agrees with the Commission that television picture ghosting resulting from transmission multipath signals "may be the most significant reception defect yet...."<sup>1</sup> Urban locales are particularly susceptible to these effects. Residents of cities located in mountainous regions find acceptable over-the-air television reception even more difficult to achieve. We further agree that reducing or eliminating ghosts will directly benefit viewers and increase their ability to make use of television programming.

## III. DISCUSSION

The Notice raises several issues which should be explored in this matter. Because it proposes to replace the existing use of line 19 by the VIR (color reference) signal, the Commission has asked whether there is any significant use of the VIR signal today. ATSC, in its Petition for Rule Making, addressed two aspects of VIR use: the generation of the VIR by the program creator, and the television viewer's ability to have the VIR continually correct the color signal in the television receiver.

The intended purpose of the VIR signal depends on the availability of television receivers designed to use it. ATSC indicates that only General Electric<sup>2</sup> produced any significant quantity of VIR-equipped receivers and that such production ceased in 1985. ATSC also believes that few such receivers remain in use and that they are capable of continued satisfactory operation in the absence of the VIR signal. NAPC has determined that every General Electric VIR-equipped television receiver manufactured was equipped with a switch so that the viewer could defeat the VIR function if desired. The presence of this defeat mechanism not only guarantees continued satisfactory operation of these

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<sup>1</sup> Notice, at p.3, ¶ 13.

<sup>2</sup> NAPC is aware that at least one other television receiver manufacturer (Panasonic) may have marketed some VIR equipped sets.

receivers in the absence of the VIR, but also provides for their continued satisfactory operation no matter what signal might replace the VIR on line 19.

The Commission solicited comments on any current uses of the VIR and whether any such uses should preclude abandonment in favor of a GCR signal. NAPC points to the lack of availability of VIR-equipped television receivers as an indication of the de facto abandonment of the VIR, at least for its intended purpose. NAPC contends that any other current use of the VIR is of a secondary nature,<sup>3</sup> and cannot directly benefit the television viewer in any manner nearly so dramatic and desirable as the ability to reduce, or eliminate picture ghosts. The Philips GCR signal offers greater channel equalization than a VIR signal.

The Commission asked for comments about whether it should simply reserve line 19 for GCR use without specifying any particular system, or whether to adopt the GCR system recommended by ATSC. NAPC notes that extensive testing, evaluation and retesting of GCR signals has been done over the last three years. The National Association of Broadcasters, Association of Maximum Service Television (MSTV) and the Broadcast Television Association of Japan (BTA) sponsored eight days of field measurements in April 1990 using the BTA GCR signal.<sup>4</sup> The results indicated that ghost canceling indeed worked, but not all that well. Subsequently, later in 1990, the National Association of Broadcasters released a Request for Proposals for improved GCR signals. Several proponents, including NAPC, responded. ATSC formed Working Party T3/S5 to evaluate

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<sup>3</sup> It is believed that some television broadcasters use the VIR as a part of the transmitter remote control system for color monitoring, and possibly control, purposes. NAPC believes that VIR utilization for these operational functions is vastly overshadowed by the very dramatic improvements to television reception which can accrue to the American public as a result of the ability to reduce, or eliminate picture ghosts.

<sup>4</sup> At that time the Ghost Canceling reference signal developed by BTA of Japan was the only GCR which had been implemented in hardware.

the submissions and to ultimately recommend the selection of the best reference signal. Five proposed reference signal submissions, including BTA were ultimately committed to hardware and made available for comparative testing.

Later, in September, October and November 1991, NAB, MSTV and CableLabs sponsored additional field measurement efforts to determine the performance capability of five different GCR systems. These observations were made by transmitting the five different GCR signals over three television stations to 106 locations in the Washington, D.C. area. Extensive laboratory measurements were performed at the Advanced Television Test Center and at CRC Laboratories in Canada. Additional field observations were made in Washington in June 1992 to chose a single best system to become the voluntary standard. All of these laboratory and field measurement results became the basis for ATSC's ultimate selection of the Philips GCR signal.

NAPC urges the Commission to ratify the selection by industry groups after substantial testing. Partnership between the Commission and industry has worked well in the past, and should work well in this instance.

The optimum GCR signal should exhibit several highly desirable properties:

- 1) High Signal Energy - The Philips GCR was shown to contain the highest energy, within a VBI line, of the five proposed GCRs.
- 2) Flat Frequency Spectrum - Over the frequency band of interest all possible frequencies should be present at the same amplitude. Of the five proposed the Philips GCR alone possesses this advantage. <sup>5</sup>
- 3) Smooth Phase Characteristic - The Philips GCR meets this requirement.

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<sup>5</sup> Three of the GCR submissions consisted of various forms of digital Pseudo Noise (PN) sequences. A single PN sequence does not have a flat frequency spectrum.

4) Shortest Time Duration - At a given energy level the time duration of the GCR within the VBI line should be relatively short to minimize possible interference with sync, color burst and signal contents of adjacent VBI lines. The time duration of the Philips GCR in the VBI line was chosen to be a minimal interval of 35.5  $\mu$ sec, consistent with acceptable ghost cancelling performance.

5) Processing Rate Immunity - The GCR's spectral characteristics and phase response should be insensitive to Digital Signal Processing sampling rates and data lengths. The Philips GCR signal, by virtue of being an analog and non-cyclic signal, performs equally well at any practical sample rate or data length.<sup>6</sup>

The Philips GCR imposes no such limitations on future hardware developments.

6) Fastest Channel Characterization - The cancellation of rapidly moving ghosts is not presently economically feasible. However, as the cost and complexity of digital computations decline and the speed continues to improve, the speed of ghost cancellation hardware should be restricted as little as possible by the GCR itself. The Philips GCR is alone in the demonstrated capability that allows acceptable full channel characterization frame-by-frame using a single VBI line.

The Philips GCR signal meets or exceeds all of the relevant criteria for a successful ghost cancellation signal system.

As with any new technological development, it is possible that a better GCR signal might someday be discovered. However, NAPC believes, based on the characteristics of the

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<sup>6</sup> PN sequence GCRs all suffer from a cyclic nature, which restricts data sampling rates and data length and severely limits possible future advances in digital processing hardware.

Philips GCR signal and the ATSC recommendation, and the extensive testing of five ghost cancellation systems, it is highly unlikely that any as yet undiscovered GCR will ever be able to provide better ghost canceling performance, or, given the already demonstrated performance capability of the selected system, even desired, during the expected lifetime of the NTSC television standard in the United States. With a signal that works so well, there is little need to cast about for some unknown, undefined alternative.

NAPC considers, based on the available record in this proceeding, that selection of the Philips GCR will permit flexibility and future improvements in ghost canceling technology. The Philips GCR signal is analog and non-cyclic, free of sample rate restrictions found in other proposals. Hardware designers have the freedom to chose different sampling rates and digital processing techniques. They can choose different conditions of speed and accuracy, depending on needs.<sup>7</sup>

The Commission therefore should, as it has done in the past, ratify the industry's standard selection by amending its Rules to specify the Philips GCR signal for line 19. NAPC commends the Commission for its decision to implement ghost cancellation in a timely manner, yet at the same time permitting the potential for change. NAPC believes that effective implementation of ghost cancellation requires the certainty that results from specifying a specific system. Therefore, NAPC recommends that the Commission specify the Philips GCR signal, and not leave the matter open.

#### IV. CONCLUSION

NAPC agrees with ATSC's contention that further reservation of line 19 for VIR signals constitutes inefficient use of vertical blanking interval capacity and that the public interest will be better served by the introduction to the television industry of ghost-reduction

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<sup>7</sup> For example, reducing or eliminating airplane flutter may require greater speed; dealing with fixed multipath conditions, more accuracy. Flexibility is built in.

capability. To that end NAPC believes that a GCR signal should replace the VIR signal on line 19. NAPC also agrees with ATSC's recommendation that the Commission specifically adopt the Philips GCR.

Respectfully Submitted,  
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